

CLAIMS

- 5 *sub* 1. A ceramic heater comprising a ceramic substrate, on a surface of which or inside which, a heating element is formed, wherein above said ceramic heater is constituted to have a structure that an object to be heated can be held apart from a surface of said ceramic substrate and heated.
- 10 2. A ceramic heater comprising a ceramic substrate, on a surface of which or inside which, a heating element is formed, wherein said ceramic heater is constituted:
to have a structure that a face of said ceramic substrate on which no heating element is formed, or one face of said ceramic substrate is made to be a heating surface; and
15 to have a structure that an object to be heated can be held apart from said heating surface and heated.
- 20 *sub A1* 3. The ceramic heater according to claim 1 or 2, wherein a through hole, in which a supporting pin for holding the object to be heated is passed through, is formed in said ceramic substrate.
- 25 4. The ceramic heater according to any of claim 1, 2 or 3, wherein said object to be heated is 5 to 5000 μm apart from the surface or the heating surface of said ceramic substrate.
- 30 5. The ceramic heater according to claim 1 or 2, wherein a convex body or a convex portion is formed on the surface of said ceramic substrate.
- 35 6. The ceramic heater according to claim 5, wherein a through hole is formed in said ceramic substrate, and a supporting pin is passed through and fixed into said through hole so that the convex body is formed on the surface

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of said ceramic substrate.

7. The ceramic heater according to claim 5,
wherein a concave portion is formed on the heating surface
5 of said ceramic substrate, and a supporting pin is inserted and
fixed into said concave portion so that the convex body is formed
on the surface of said ceramic substrate.

8. A supporting pin,
10 wherein:
a contact portion formed at a tip;
a fitting-in portion formed under said contact portion
which has a larger diameter than that of said contact portion;
a pillar-shaped body formed under said fitting-in portion
15 which has a smaller diameter than that of said fitting-in
portion; and
a fixing portion formed on the lower end of said
pillar-shaped body which has a larger diameter than that of the
pillar-shaped body;
20 are integrated to one body.

9. A supporting pin,
wherein:
25 a pillar-shaped body; and
a fixing portion having a larger diameter than that of said
pillar-shaped body
are integrated to one body.

30 10. The supporting pin according to claim 9,
wherein a tip of said pillar-shaped body is in a spire
shape or in a hemispherical shape.

35 11. A ceramic heater:

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comprising a ceramic substrate, on a surface of which or inside which, a heating element is formed; and

which is constituted to have a structure that an object to be heated can be held apart from a surface of said ceramic substrate and heated,

wherein:

a through hole composed of connected holes, said holes having mutually different diameters, is formed in said ceramic substrate;

the supporting pin according to claim 8 is passed through said through hole;

the fitting-in portion of said supporting pin is inserted and fitted into the portion with the relatively large diameter of said through hole; and

a metal member for fixing is fitted in between the fixing portion of said supporting pin and the bottom surface of said ceramic substrate.

12. A ceramic heater:

comprising a ceramic substrate, on a surface of which or inside which, a heating element is formed; and

which is constituted to have a structure that an object to be heated can be held apart from a surface of said ceramic substrate and heated,

wherein:

a concave portion is formed in the heating surface side of said ceramic substrate;

the supporting pin according to claim 9 is inserted into said concave portion; and

a spring for fixing is fitted to said concave portion so as to contact the wall surface of said concave portion in the state that the spring for fixing surrounds said pillar-shaped body.

13. The ceramic heater according to any of claims 1 to 7, 11,

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and 12,

wherein an electrostatic electrode is set up inside said ceramic substrate.

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